Thinkers Remobilized

Science and Technology Advice to the President, Congress, and Judiciary. WILLIAM T. GOLDEN, Ed. Pergamon, Elmsford, NY, 1988. xvi, 523 pp. $49.95; paper, $24.95.

This book is a collection of some 85 essays by nearly everyone who might be expected to write with authority on the subject its title sets forth. Its basic purpose, as presented by its editor, William Golden, is "to provoke thought, to stimulate discussion and to encourage action." More specifically, its editor and perhaps most of its contributors clearly hope that the views it presents and the advice it offers will somehow reach and influence the new president we are about to elect.

In effect, this book is a second try in that regard, the first being the companion volume *Science Advice to the President*, published in 1980, compiled by the same editor and featuring many of the same authors. In the judgment of the majority, but not all, of the contributors to the second volume, that first effort either fell on deaf ears or for some other reason failed to accomplish its purpose.

Most of the essayists take the relationship between the President and his science advisers as it existed during the Eisenhower and Kennedy administrations as their ideal. And indeed, in both form and spirit it was a very special relationship in those days.

Eisenhower became president just as the Korean War was winding down. In the years immediately preceding, the Soviet Union had exploded its first atomic bomb, thus ending forever our brief monopoly of that powerful weapon. To compound the situation, Chairman Mao paid a two-month-long visit to Moscow at the end of which he and his very special comrade Joseph Stalin declared their Sino-Soviet Bloc to be both eternal and hostile. The sudden onset of the Korean War itself, coming only months after Mao had returned home, seemed to confirm our worst fears. The American public generally was worried about the future, and Eisenhower and his assistants sought ways to improve our overall national security posture. It was obvious there was no hope of matching the Sino-Soviet Bloc in manpower or any other measure involving sheer numbers, so, naturally enough, we turned to what seemed to be our strongest suit, high technology, as the preferred means for containing the bloc and maintaining the peace.

As an early step, an ad hoc group, the "Technological Capabilities Panel," chaired by James R. Killian of MIT and reporting to the National Security Council, was established. The group performed its job promptly and well, and the President and the defense establishment as a whole adopted its recommendations. These included "highest priority" programs for the development of the first generation of intercontinental ballistic missiles, the sea-based Polaris system, and the U-2 reconnaissance airplane. The conditions were just right; the President knew he needed technical advice and there was an exceptionally able group of men ready to give it to him.

Just a few years later, the Soviets put Sputnik into orbit and thereby reconfirmed the notion that we were faced with serious problems, among them some important ones that were basically technological in nature. President Eisenhower turned again to Killian, but this time he created a permanent arrangement very close to that which Golden had recommended to Harry Truman seven years earlier. As a result, Killian served both as Special Assistant to the President and as Chairman of the President's Science Advisory Committee for approximately two years, after which he was succeeded in both posts by George B. Kistiakowsky, a Harvard chemist and Manhattan Project veteran. John F. Kennedy continued the arrangement with Jerome Wiesner, also of MIT.

From the launch of Sputnik to the death of Kennedy, the presidents and their teams of advisers dealt mostly with military matters, including arms control, plus space. Both presidents knew they needed advice in these areas, both actively sought it, and both happily found it in a body of men that worked hard, loyally, and very largely confidentially to supply it.

Lyndon Johnson's main concerns were different—winning the war in Vietnam and creating the Great Society. Neither American science as a whole nor the science advisory apparatus in particular was able to make a decisive contribution to the war effort, and, though the PSAC knew very well how to foster and improve scientific education and research at the most prestigious institutions, it proved to have less to offer when it came to helping those institutions that were not already centers of excellence or at least on the verge of becoming so. As a result, the status and influence of scientific advisers to the President began to wane in the '60s, and they have never since recovered. Several of the essays in this collection describe the passing of the original glory days and provide further details of the various events that caused, or reconfirmed, that process.

Other essayists take a different view. The glory days, they write, may indeed have constituted some sort of an ideal, but the circumstances have changed so much that they neither can nor ought to be repeated. The issues themselves are "no longer as straightforward as putting man on the moon or filling a missile gap, real or imagined." And mechanisms for coping with today's technological issues abound and have become a regular part of the bureaucratic structure in all major elements of the executive branch and in the legislative and judicial branches as well. (Two separate sections of the book deal with advice to Congress and the judiciary.)

We will soon know whether the 1988 version of this book does better than its 1980 predecessor in influencing the course of events, but however that comes out the book is and will long remain a real gem for students of these times and issues. I can think of no other place where it is possible to find so many good but brief essays by so many well-informed people on such an important topic.

HERBERT F. YORK
Institute of Global Conflict and Cooperation, University of California at San Diego, La Jolla, CA 92093

The Decline of Enlightenment

How Superstition Won and Science Lost. Popularizing Science and Health in the United States. JOHN C. BURNHAM. Rutgers University Press, New Brunswick, NJ, 1987. xii, 369 pp., illus. $35; paper, $16.

John C. Burnham has written a powerful and intense jeremiad. His superbly researched and broadly focused book relies upon a mass of monographs, articles, autobiographies, memoirs, and scholarly analyses to make its case, incorporating the views of historians, scientists, journalists, sociologists, psychologists, physicians, and clergymen, among others. But at heart it is an angry cry of contempt for a process of degeneration that he finds has been under way in this country for much of the present century.

The popularization of science and health

enjoyed, Burnham argues, a noble status in Victorian America. Its advocates clung to a heroic dream of the scientific calling and saw their mission as the extermination of popular superstition, mysticism, fanaticism, and unreason. They could, in the late 19th century, easily recall their distinguished pedigree, a lineage that had been boldly apparent during the Age of Enlightenment when religion and popular folklore both posed apparent threats to the ideals of science, ideals Burnham carefully outlines.

Through lecture circuits, museums, classrooms, widely selling magazines and journals, books, college textbooks, and even the daily press the popularizers made their views known. Their audience, for much of the earlier period Burnham examines, was dominated by an informed, intellectually curious, socially ambitious lay public, prepared to invest some time and energy in the understanding of the new scientific languages.

Theorists of health, psychology, and natural science, the three areas that Burnham studies in some depth, preached gospels that, despite some differences of emphasis and technique, shared many qualities. With "evangelical enthusiasm" they sought to disperse "a positivistic, reductionistic view of the natural world." Condemning exploiters of human credulity, championing reason, proclaiming fidelity to truth, and skeptical of traditional authority, they projected a religious zeal in their combat against mystery, scholasticism, and "dogma." Science, said one of the great popularizers of the late 19th century, E. L. Youmans, was not a set of things but "a method of knowing" that applied to "all things that can be known." The great names in this campaign—among them David Starr Jordan, Edwin E. Slosson, C. W. Eliot, William Graham Sumner, John W. Draper, and Franklin H. Giddings—were frequently distinguished scholars and educators themselves who used military metaphors in their eagerness to exterminate superstition.

But at some point between World War I and World War II, even earlier for some areas, popularization of science and health in America changed drastically, Burnham insists, and not for the better. In the field of health, for example, the task of popularizing was yielded up by scientists and physicians to journalists and pedagogues, and the goal of transmitting systematic knowledge became instead a concentration upon products and consequences. Social marketing promoted by advertising specialists, journalists, and special advocates moved from the moralism and scientism of an earlier day to "arbitrary health habits and romantic self-centredness." Increasingly, commercial interests and public relations came to dominate. Sensationalism focused attention on isolated facts, specific dangers, exaggerated threats, and extraordinary if unfounded promises. Individual cures or discoveries took the center rather than the scientific process or the research method. The "isolated-facts format was exactly the one that nineteenth-century popularizers had fought against," says Burnham, for this was the very basis of superstition: singular facts cut off from a clearly argued context. Health advice "was reduced to just another among the many amoral, unconnected, often unreasoned assertions that passed for popular science in the late twentieth century."

In the case of psychology, specialization and vulgarization eroded its position within a broad high culture in favor of a journalistic obsession with trendy, episodic, life-style concerns and the cultivation of a "new form" of superstition. And in the natural sciences an emphasis upon technology, personal celebrity, and new products replaced scientific explanation, with the most sophisticated levels of analysis reserved for a converted audience already involved in some aspect of science, readers of *Scientific American*, for example. This, the only rigorous popularization that was left, permitted scientists and technicians to learn about one another's specialties, rather than introduce their achievements to a lay public.

The enemies to popularization are clearly identified. They include the mass media, from yellow journalism to television, commercialization, advertising, consumer packaging, public relations, progressive education—a familiar litany to critics of modern American life. There were ebbs and flows to popularizing methods in the 20th century, periods of apparent recovery and serious interest followed by more retrogression—but the downward trend seems absolutely clear to Burnham.

It is difficult not to be impressed with the range of evidence Burnham has assembled, and almost impossible to be out of sympathy with his larger view. The argument, however, is relentlessly repeated and occasionally polemicized or simplified to the extent of being self-defeating. Time lines are often blurred by early anticipations of later vulgarization or late survivals of serious popularization. Parallels drawn between very different audiences make for some confusion. Some contemporary forms of science reporting—the *New Yorker* essays of the past few decades, the work of Stephen Jay Gould, Lewis Thomas, Freeman Dyson—receive almost no attention. There are indications that today's public is more knowledgeable about the politics, the prejudices, the conceits, and the human structure of scientific research than were amateurs of earlier days. And the technically oriented constituency for popular science, even if it does not quite fit within the definition of a lay audience, has become numerically impressive.

Nonetheless, Burnham's major position remains powerful. Contemporary science is believed in by a credulous public rather than understood by an informed one. Today's popularizing processes, compared with some earlier versions, seem condescendingly simple-minded or narrowly opportunistic. And few distinguished researchers bother to concern themselves with speaking to a large lay audience.

If the problem has been identified, however, a solution has not. And science interpretation has not been alone in its decline. Popular writing on architecture, the graphic arts, music, literature, and economics may also be charged with various forms of degeneration. The issue then, is nothing less than the organization of contemporary life, its value structures and attitudes toward authority, leisure, intelligence, and achievement. It seems made to order for the jeremiad that Burnham has written.

NEIL HARRIS
Department of History,
University of Chicago,
Chicago, IL 60637

Books Received

Epidemiology, Health, and Society. Selected Papers. Mervyn Susser. Oxford University Press, New York, 1987. x, 309 pp., illus. $39.50.

Evolutionary Epistemology. A Multiparadigm Program. Werner Callebaut and Rik Pinxten, Eds. Reidel, Dordrecht, 1987 (U.S. distributor, Kluwer, Norwell, MA). xii, 458 pp. $68. Synthese Library, vol. 190. Based on a conference, Ghent, Belgium, Nov. 1984.

Expanding Protons. Scattering at High Energies. Hung Cheng and Tai Tsun Wu. MIT Press, Cambridge, MA, 1987. xvi, 285 pp., illus. $40.

The Great Design. Particles, Fields, and Creation. Robert K. Adair. Oxford University Press, New York, 1987. viii, 376 pp., illus. $24.95.

The Greenhouse Effect, Climate Change, and U.S. Forests. William E. Shands and John S. Hoffman, Eds. Conservation Foundation, Washington, DC, 1987. xiv, 304 pp., illus. $29.95.

Hepadna Viruses. William Robinson, Katsuro Koike, and Hans Will, Eds. Liss, New York, 1987. xxvi, 646 pp., illus. $120. UCLA Symposia on Molecular and Cellular Biology, vol. 70. From a symposium, Keystone, CO, March–April 1987.

Hetero Diels-Alder Methodology in Organic Synthesis. Dale L. Boger and Steven M. Weinreb. Academic Press, Orlando, FL, 1987. xii, 366 pp., illus. $89. Organic Chemistry, vol. 47.

Invertebrate-Microbial Interactions. Ingested Fungal Enzymes in Arthropod Biology. Michael M. Martin. Comstock (Cornell University Press), Ithaca, 1987. xii, 148 pp., illus. $32.50; paper, $14.95. Explorations in Chemical Ecology.

Irrigation Development Planning. An Introduction for Engineers. J. R. Rydzewski, Ed. Wiley, New York, 1987. xiv, 265 pp., illus. $53.95.

Life in the Cold. An Introduction to Winter Ecology. Peter J. Marchand. University Press of New England, Hanover, NH, 1987. xvi, 176 pp., illus. $18; paper, $9.95.

Microcosmos. Jeremy Burgess, Michael Marten, and Rosemary Taylor. Cambridge University Press, New York, 1987. 208 pp., illus. $29.95.

(Continued on page 1555)